

**\*79934\***

February-07-12 2:26:10 PM

**\*N900040100\***

Setup Start \*NS1\*

Stop **\*NS2\***

**Start Date:** 07/02/2012    **Start Qty:** 1.00    **\*1\***

**Required Date:** 27/02/2012      **Req'd Qty:** 1.00      **\* 1 \***

**Reference:**

Approvals: Process Plan: MLJ Date: 12/02/07 Tooling:

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: 1 / 1 SPC (Y/N): \_\_\_\_\_

Stop **\*NR2\***

[illegible]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Work Order ID 79934

\*79934\*

Page 2

February-07-12 2:26:10 PM

Item ID: D407-667-105

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Item Name: Crosstube Fwd

Stop \*NS2\*

Start Date: 07/02/2012 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start \*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop \*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

120

0.00

\*120\*

CNC Bend 2

BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D407-667-145 using CNC bender program 407-fw

MO/  
FW

12/2/27

130

QC15- Crosstube Dimensional Check

0.00

\*130\*

QC

Memo

0.00

Quality Control

8 12/2/27

QD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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**NOTE:** Date & initial all entries

**Work Order ID 79934****\*79934\***

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Item ID: D407-667-105

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Fwd

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

140

0.00

**\*140\***

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- scribe batch # inside of cuff

2-Drill pilot holes in tube using drill Jig DT8541 &amp; DT8542 as per Dwg D407-667-145. Drill all (3) top holes use drill table jig DT8577 hole #1,#11 to set up towers, as per QSI0010.

3-Drill and Ream all holes in tube to finish size using drill Jig DT8541 &amp; DT8542 as per Dwg D407-667-145 Check dimensions between holes on all four sides.

4-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

5-Drill pilot holes using drill Jig DT8541 &amp; DT8542 as per Dwg 407-667-145. Drill only the top (2) holes.

6-Drill &amp; ream the top (2) holes to finish size using drill Jig DT8541 &amp; DT8542 as per Dwg D407-667-145

7-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-145. Note: Fwd side has 3x top holes.

8-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D407-667-145.

9-C'sink holes as per Dwg D407-667-145. Allow rivet to sit below surface to compensate for paint.

10 -Deburr &amp; Inspect for surface damage. Repair damage within limits as per

MO/RM 12/2/27

TW

12-2-27

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 79934****\*79934\***

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February-07-12 2:26:10 PM

Item ID: D407-667-105

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Fwd

Stop **\*NS2\***

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Dwg D407-667-145

150

Crosstubes Chemical Conversion

0.00

**\*150\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

160

QC7 Inspect Chemical Conversion Coat

0.00

**\*160\***

QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

**\*170\***

QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**\*79934\***

Page 5

**Accept**

**\*N900040100\***

Setup Start \*NS1\*

Stop \*NS2\*

**Start Date:** 07/02/2012    **Start Qty:** 1.00    **\*1\***

**Cust Item ID:**

**Required Date:** 27/02/2012      **Req'd Qty:** 1.00      **\* 1 \***

**Customer:**

**Reference:**

**Approvals:**      **Process Plan:** \_\_\_\_\_      **Date:** \_\_\_\_\_      **Tooling:** \_\_\_\_\_      **Date:** \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

180	Outsource process - NDT per QSI038 4.1	0.00
-----	--	------

**\*180\***

Outsource2

### Outsource process - NDT

## Memo

0.00

OUTSIDE SERVICE -CROSSTUBES  
Liquid Penetrant Inspection as per QSI 038 Or  
Issue P/O 14341 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

190	0.00
-----	------

\*190\*

## Packaging

## Packaging

### Packaging

## Memo

0.00

Inspect for transit damage  
Ensure copy of NDT results attached to work order.

200	QC5- Inspect part completeness to step on W/O	0.00
-----	---	------

**\*200\***

QC

## Quality Control

## Memo

0.00

Inspect for damage & ensure results are as per Dwg D206-667-145

W/O: 79934		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D409-667-105 PAR #: \_\_\_\_\_ Fault Category: Landi gear/cass NCR: Yes No DQA: Auto Date: 12/03/16  
take  
 Resolution: Re work Disposition: Re work QA: N/C Closed Date: 12/3/16

NCR: 12-1262		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12/03/05	190	tube had indentation found at NDT inspection R.C. Process	CP 12/03/05 PS/WH	Grind out marks Re Alodine as per QSR 405	JW 12-3-02 JW 12-3-2	S 12/3/15	CP 12-3-5 PS/WH	S 12/3/15

NOTE: Date & initial all entries

# Work Order ID 79934

**\*79934\***

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Item ID: D407-667-105

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Fwd

Stop **\*NS2\***

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210		0.00							
<b>*210*</b>	SprayPaint								
SprayPaint	<b>Memo</b>	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: <u>11:30</u>								
	Finish Time: <u>12:00</u>								
	PAINT:								
	Start Time: <u>4:00</u>								
	Finish Time: <u>5:00</u>								
220	QC14- Inspect Spray Paint	0.00							
<b>*220*</b>									
QC	<b>Memo</b>	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

*Handwritten notes and signatures:*  
 12 - 3 - 5  
 12 03  
 06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 79934

**\*79934\***

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February-07-12 2:26:10 PM

Item ID: D407-667-105

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Fwd

Stop **\*NS2\***

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
<b>*230*</b>	Crosstubes								
Crosstubes	<b>Memo</b>	0.00							
Crosstubes	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DSI9565 and QSI 015 A/R Proseal 890 Batch: <u>120072</u>								
	3- Torque bolts as per dwg								
	4-Install nut plates as per Dwg D407-667-145. Touch-up rivet heads with Imron paint.								
240	QC5- Inspect part completeness to step on W/O	0.00							
<b>*240*</b>									
QC	<b>Memo</b>	0.00							
Quality Control									

12-3-6

*Sr/12/12*

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 79934

**\*79934\***

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February-07-12 2:26:10 PM

Item ID: D407-667-105

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Fwd

Stop **\*NS2\***

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00							
<b>*250*</b>									
Packaging	Memo	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
<b>*260*</b>									
QC	Memo	0.00							
Quality Control									
270	Packaging	0.00							
<b>*270*</b>									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D407-667-105								
	Location: _____								
	PPP Rev: _____								

12/3/88

See lot

1x SP12-03-09

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 79934****\*79934\***

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Item ID: D407-667-105

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Fwd

Stop **\*NS2\***

Start Date: 07/02/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 27/02/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00							
<b>*280*</b>									
QC	Memo	0.00							
Quality Control									

12/3/12  
MF  
12-03-09

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

Page 1

February-07-12 2:26:14 PM

Work Order ID: 79934

**\*79934\***

Parent Item: D407-667-105

**\*D407-667-105\***

Parent Item Name: Crosstube Fwd

Start Date: 07/02/2012

Required Date: 27/02/2012

Start Qty: 1.00

Required Qty: 1.00

**Comments:**  
 IPP Rev:F 05.09.01 Add holes for compatibility with Bell SkidtubesKJ/JLM  
 IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC  
 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec  
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC  
 IPP Rev:J 08-07-28 update as per (par 08-013) DD verified by:EC  
 IPP Rev K 09.01.06 ECN 08-562 EC verified by:DD IPP REV:L  
 11.08.05 PER ECN 11-615 DD VERF:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-105TRN <b>*D407-667-105TRN*</b> Crosstube Turning Detail		Manufactured	No		B 79882	110	Each	0.0000	1	1		MO	12/2/27
									**				
D2873-043 <b>*D2873-043*</b> Nut Plate Assembly		Manufactured	No			230	Each	18.0000	2	2		AL 12-3-6	
									**				
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG052	79395	18				2			
					72644	2							
					75010	16							
D2873-045 <b>*D2873-045*</b> Nut Plate Assembly		Manufactured	No			230	Each	11.0000	2	2		AL 12-3-6	
									**				
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG052	79318	11				2			
					74985	11							
D2891-1 <b>*D2891-1*</b> 2.25 Support		Manufactured	No			230	Each	24.0000	2	2		AL 12-3-6	
									**				
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG052		24							
					72822	4							
					75176	20				2			

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Page 2

Work Order ID: 79934

**\*79934\***

Parent Item: D407-667-105

**\*D407-667-105\***

Parent Item Name: Crosstube Fwd

Start Date: 07/02/2012

Required Date: 27/02/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-395

Manufactured No

230

Each

42.0000

4

4

**\*D3595-063-395\***

RUBBER CUSHION

\*\*

AB 12-3-6

Location

Loc Qty

Loc Code

MAT052

42

74300

42

4

MS20601-AD4W10

Purchased

No

230

Each

109.0000

14

14

**\*MS20601-AD4W10\***

RIVET

\*\*

AB 12-3-6

Location

Loc Qty

Loc Code

LG051

109

118675

9

119386

100

14

MS21920-20

Purchased

No

230

Each

54.0000

4

4

**\*MS21920-20\***

Clamp (per MIL-DTL-8783C)

\*\*

AB 12-3-6

Location

Loc Qty

Loc Code

LG050

54

116799

8

120475

46

4

AN5-10A

Purchased

No

250

Each

396.0000

10

10

**\*AN5-10A\***

Bolt

\*\*

12/03/88

Location

Loc Qty

Loc Code

ST337

396

118191

80

119547

216

119981

100

10

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Work Order ID: 79934

**\*79934\***

Parent Item: D407-667-105

**\*D407-667-105\***

Parent Item Name: Crosstube Fwd

Start Date: 07/02/2012

Required Date: 27/02/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-30A

Purchased

No

250

Each

93.0000

4

4

\*\*

**\*AN5-30A\***

BOLT

Location

Loc Qty

Loc Code

ST339

93

117514

7

118706

11

120423

75

AN5-32A

Purchased

No

250

Each

250.0000

4

4

\*\*

**\*AN5-32A\***

Bolt

Location

Loc Qty

Loc Code

ST339

250

118983

25

119328

100

119862

50

120423

75

AN960JD516

NAS1149D0563J

Purchased

No

250

Each

0.0000

18

18

\*\*

**\*AN960JD516\***

Washer

MS21042L5

Purchased

No

250

Each

1,840.000

4

4

\*\*

**\*MS21042L5\***

Nut

Location

Loc Qty

Loc Code

ST300

1840

116105

5

116548

43

117611

42

118179

250

119109

1500

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

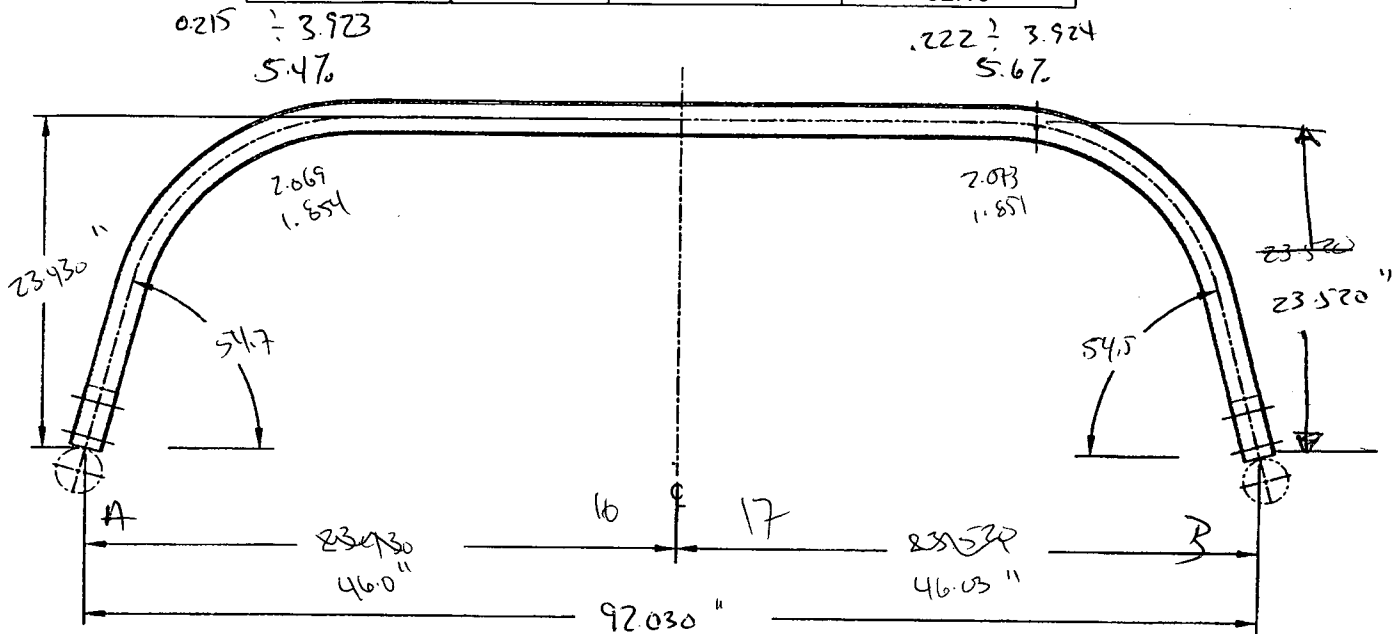
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	79934
<b>Description: Crosstube High Fwd (407)</b>	<b>Part Number:</b>	D407-667-105
<b>Inspection Dwg: D407-667-145</b>	<b>Rev: C</b>	<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	23.41	23.67
1/2 Span	45.81	46.07
Angle	54	56
Total Span	91.63	92.13



Comments	
Size A2	5.47% crushing @ 16 passes.
Size B2	5.67% crushing @ 17 passes.

QC15 Inspection	8
Date	12/02/27

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.11.12	Dimensions updated per Dwg Rev C	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -145	Part Number	Description
1	X	D407-667-145	CROSSTUBE ASSEMBLY (407 HIGH FWD)
2	1	D6010-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6010-115  
FINISHED LENGTH = 113.20±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-145" AND BATCH NUMBER ON  
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 17.8 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY,  
TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE  
TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER  
QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE  
THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS  
ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

UNCONTROLLED  
SUBMITTAL

NO. 79934 H.C.J.  
12/02/07

DEO ATTACHED

PCW #11-615  
11.07.26

UNDER REVIEW

RELEASED  
03/11/12

C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. 7 ADD TOLERANCES (ZN C6-3, C4-3, D2-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	02.05.08
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. C
CHECKED	RF	D407-667-145	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

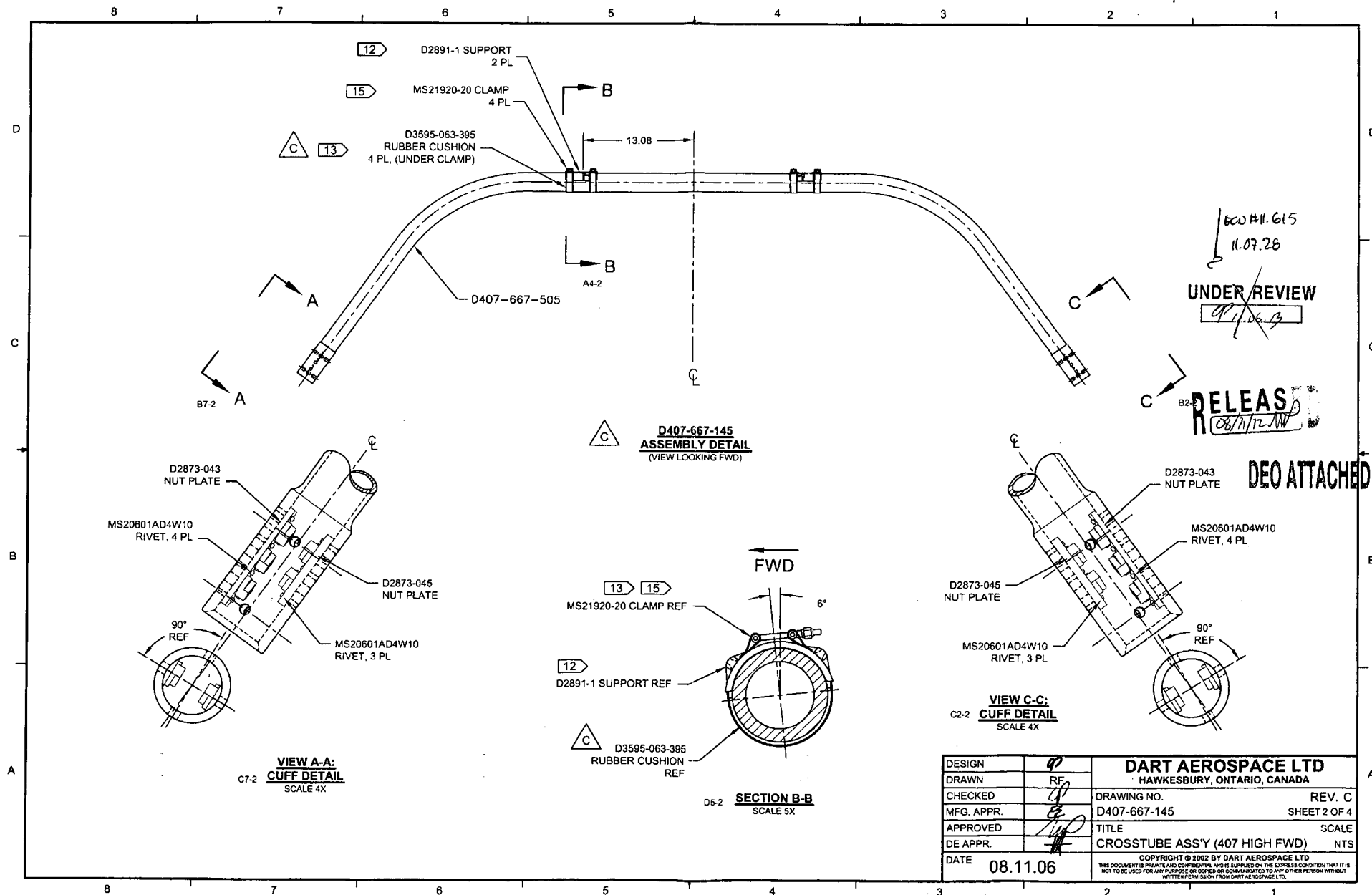
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79934



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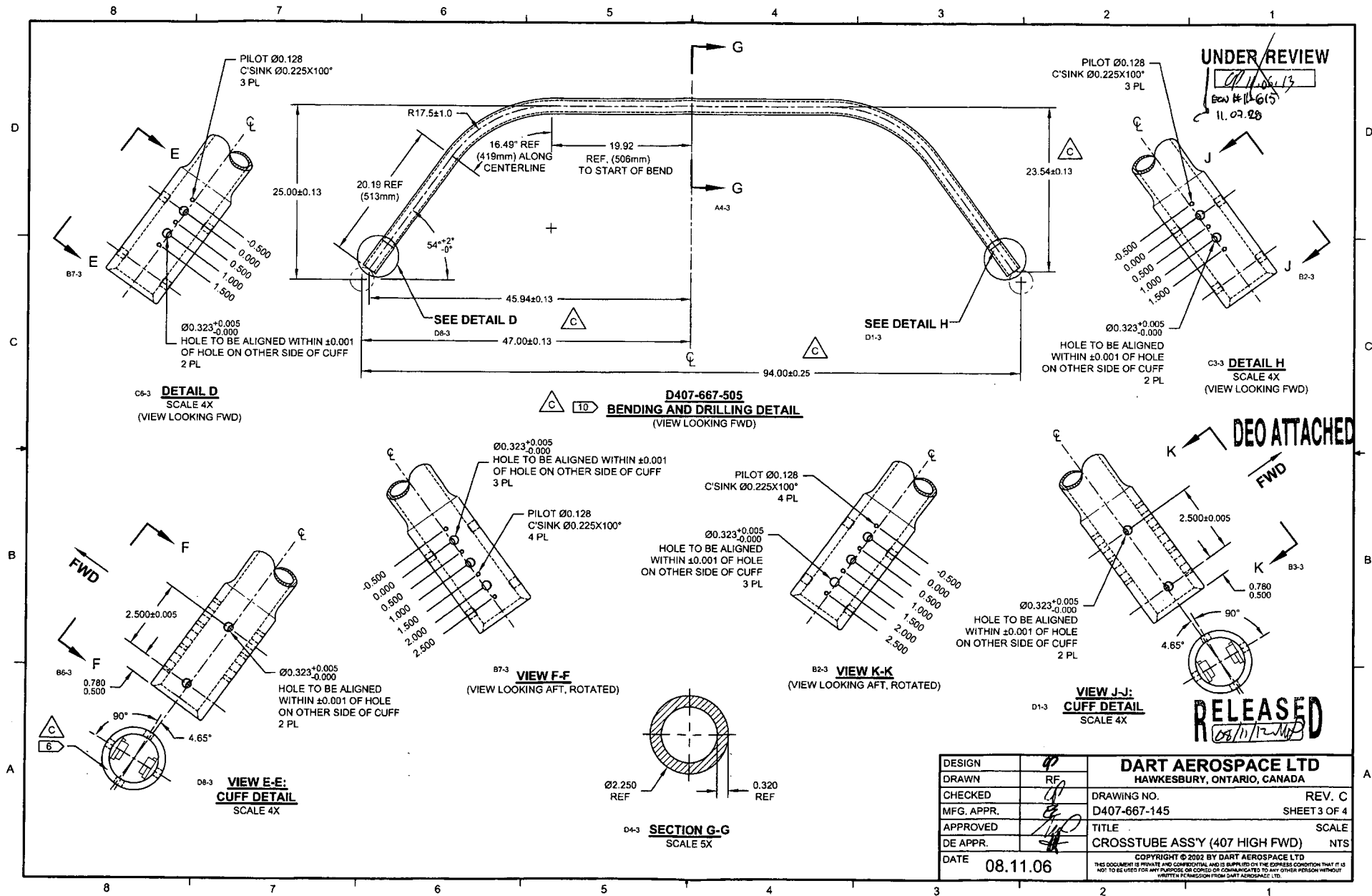
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79934



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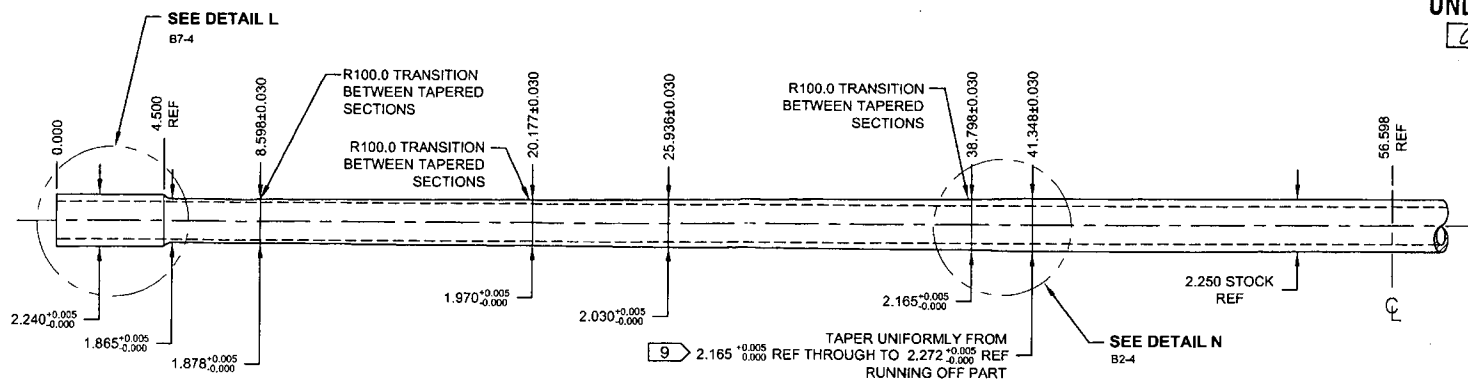
**NOTE:** Date & initial all entries



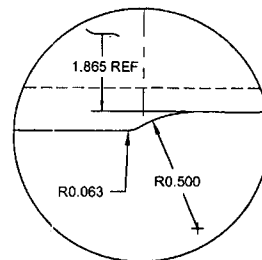
79934

UNDER REVIEW

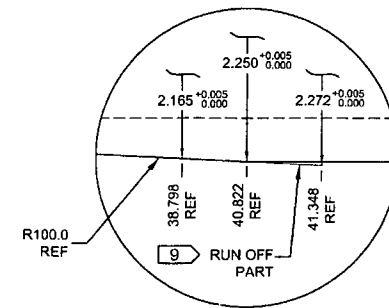
08/11/06  
800 H11.615  
11.07.26



**TURNING DETAIL**



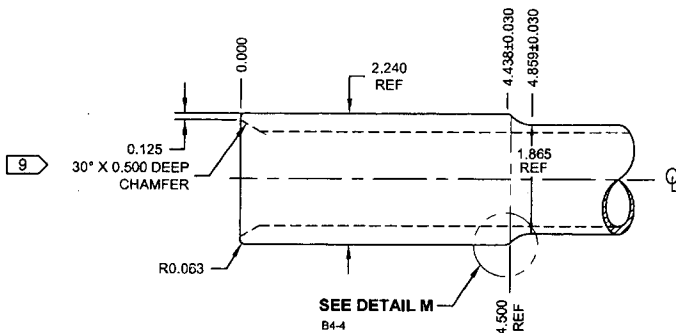
**DETAIL M:**  
CUFF TRANSITION  
NOT TO SCALE



**DETAIL N:**  
TAPER RUN-OFF  
NOT TO SCALE

DEO ATTACHED  
RELEASED  
08/11/06

**DETAIL L:**  
CROSSTUBE CUFF  
NOT TO SCALE



DESIGN	40	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. C
CHECKED	40	D407-667-145	SHEET 4 OF 4
MFG. APPR.	40	TITLE	SCALE
APPROVED	40	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DE APPR.	40	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL. AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

79934

DRAWING NO. D407-667-145	TITLE CROSSTUBE ASS'Y (407 HIGH FWD)	REV. C	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D407-667-145-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 47	CHECKED 155	MFG. APPR. 155	APPROVED WD		DE APPR. H		
DATE 11.07.15	DATE 11.07.22	DATE 11.07.22	DATE 11/07/22		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -145	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) TO INSTALL D2891-1 SUPPORT: ABRAD MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-07-28  
WD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



## LIQUID PENETRANT TEST REPORT

P- 14909

PAGE 1 OF 1

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/NO No.

WORK LOCATION

ACCEPTANCE STD

TIME

AM

PM

REV./DATE

JOB DESCRIPTION

PROCEDURE No. LT002 REV./DATE 7008

TECHNIQUE No. LT002 REV./DATE 2008

PART NO.

SCOPE

TEST DETAILS

METHOD

☒ FLUORESCENT☐ VISIBLE☒ WATER WASH☐ SOLVENT REMOVABLE☒ POST EMULSIFIED

FAMILY BRAND

PENETRANT

PENETRANT REMOVER

DEVELOPER

DEVELOPER TYPE

MAGNAFLUX

ZL67

H20

SKD 52

☒ NON AQUEOUS

MINIMUM DWELL TIME

MINIMUM DRY TIME

MINIMUM DWELL TIME

☐ AQUEOUS☐ DRY

MIN.

MIN.

MIN.

BLACK LIGHT S/N

LIGHTING EQUIP.

OTHER

LIGHT METER S/N

☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup>☐ FLASHLIGHT☐ TROUBLELIGHT☐ OUTPUT > 100 fc @ SURFACE

CAL DUE DATE

☐ AMBIENT < 2 fc☐ AMBIENT < 2 fc☐ AMBIENT < 2 fc☐ AMBIENT < 2 fc☐ AMBIENT < 2 fc

TEST SURFACE

SURFACE CONDITION

☐ AS GROUND☐ AS WELDED☒ MACHINED☐ SHOT BLASTED☒ CLEAN BARE METAL

SURFACE TEMPERATURE

☐ < - 4°C/ 20°F☐ - 4°C/ 20°F TO 10°C/ 50°F☒ 10°C/ 50°F TO 52°C/ 125°F☐ > 52°C/ 125°F

RESULTS-

☐ METRIC ☐ IMPERIAL

CROSS TUBES			
1 - W.O.	73924	x	REBLAND 1 TIME
1 - W.O.	76252	✓	REBLAND 1 TIME
1 - W.O.	75662	✓	REBLAND 1 TIME
1 - W.O.	75664	✓	REBLAND 1 TIME
1 - W.O.	79934	✓	REBLAND 1 TIME
1 - W.O.	79933	✓	REBLAND 1 TIME
1 - W.O.	79019	✓	REBLAND 1 TIME
1 - W.O.	79018	✓	REBLAND 1 TIME
1 - W.O.	76254	✓	REBLAND 1 TIME

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended to nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the use or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

Andrew Sheldon

PRINT

Signature

SIGNATURE

DTR # E68914

TECHNICIAN (SIGNATURE):

Signature

REPORT

REVIEWED BY:

NAME (PRINT):

Mike J. H. S. S. S.

NAME

INITIALS

1<sup>ST</sup> TECHNICIAN2<sup>ND</sup> TECHNICIAN

CGSB LEVEL

SNT LEVEL

CGSB LEVEL

SNT LEVEL

CGSB REG. No.

66606

CGSB REG. No.

WHITE - CLIENT COPY

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PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005